Introducing OneCode^{CONFIRM}

Using OneCode^{SOLUTION} as an Alternative to PLANET Code® for Confirm® Service

Prepared by:
Intelligent Mail Planning and Standards
United States Postal Service

Rev. 8.2
March 15, 2006

Disclaimer

Information conveyed in this document is preliminary. The information in this document is intended to give mailers and service providers preliminary information on the use of OneCode^{SOLUTION} barcode for Confirm® Service.
U.S. Postal Service reserves the right to change the information conveyed in this document without prior notice.

TABLE OF CONTENTS

1 Program Overview

1.1 Background

With Intelligent Mail as a key strategy of the US Postal Service Transformation Plan, the Postal Service adopted the following Intelligent Mail Vision in 2003.

> *The Postal Service and its customers capitalize on the value of information about mail by placing a standardized, information-rich code on all mail to enable end-to-end visibility into the mail stream.*

The Postal Service has identified three key strategies to achieve the Intelligent Mail Vision:

Uniquely Identify Mail and Unit Loads

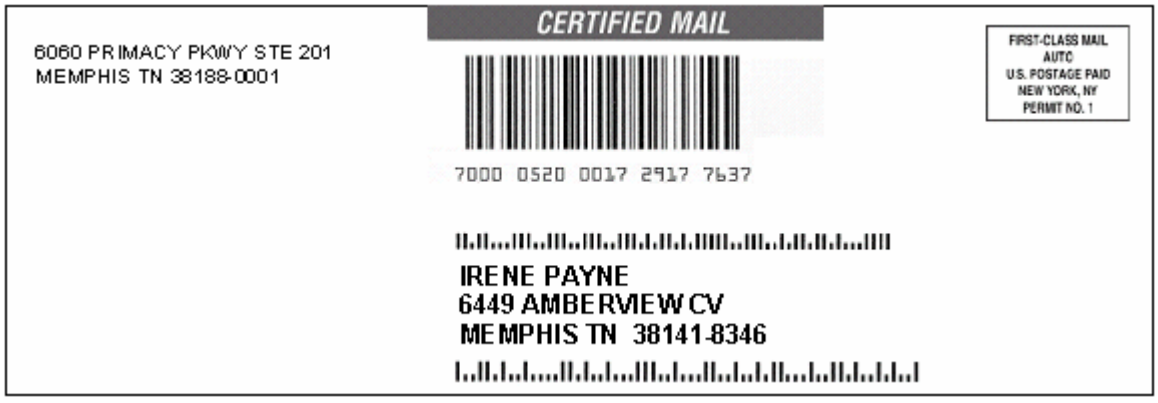
Develop and Deploy Enabling Infrastructure

Enhance Address Quality

The Postal Service is committed to work with the mailing community to ensure that all mail can be uniquely identified and tracked so as to provide value-added services to postal customers and improve mail service.

1.2 Challenges

There can be many barcodes on letters and flats today, as depicted in the following illustration.



The Postal Service and its customers have been using the POSTNET barcode since the 1980s to encode 5, 9, or 11-digit delivery-point barcode. In the 1990s, PLANET Code barcode was introduced to enable tracking of letters and flats through the Confirm program, and Special Services barcodes were introduced to track mail that subscribes to special services, such as Delivery Confirmation™ and Certified Mail™. The need to apply separate barcodes for different services encroaches on the aesthetic and available real estate of the mail and presents a challenge to the mailers.

For Confirm users, the 13-digit[1] PLANET Code limits each mailer to 1 million unique serial numbers. The Postal Service is keenly aware that this is inadequate for a larger mailer who could enter more than 1 million pieces of mail in any given day. The Postal Service has therefore begun to develop more advanced coding standards that can significantly increase the amount of information carried but requiring only minimal increase in space on the mail piece.

1.3 Advantages of OneCode^{SOLUTION} Barcode

Two types of advanced barcodes were considered as potential alternatives to PLANET Code barcode.

- 4-State Barcode

- 2D Barcode

PDF417
(2D Stacked)

Data Matrix
(2D Matrix)

A 4-state barcode is similar to the existing POSTNET Code and PLANET Code. They belong to the class of height-modulated barcode. While POSTNET barcode and PLANET Code barcode use tall bars and short bars to encode data, 4-state barcode uses tall bars and short bars at 3 different vertical positions so that more information can be encoded in about the same amount of space.

2D barcodes are more complex code, using 2-dimensional spatial distribution of pixels to encode information. 2D barcodes have higher information carrying capability than 4-state barcodes. The Postal Service permits the use of 2D barcode for postage indicia imprint in conjunction with online postage payment and on new postage meters.

Several other Postal Administrations developed the 4-state barcode after the Postal Service implemented the POSTNET code. Preliminary tests conducted by the Postal Service have demonstrated that the 4-state barcode has similar read rate as the POSTNET barcode and PLANET Code barcode.

But the most important consideration in deciding between 4-state barcode and 2D barcode is mailers' ability to print. Accordingly, as part of the decision process to choose between 4-state barcode and 2D barcode, a mailer's technology study was conducted in 2003 to understand the mailing industry's potential to print more advanced barcodes. Over 300 mailers that represent all customer account types and industry segments were interviewed. The study found that 59% of the mailers interviewed use inkjet technology and 32% use laser technology for printing barcode. Inkjet and laser technologies can be easily converted to print 4-state barcode with minimal software changes. Therefore, more than 90% of the mailers are already equipped to adopt 4-state barcode. On the other hand, a majority of the mailers would have to invest in more advanced printing technology in order to adopt 2D barcode. The Postal Service is therefore moving forward with offering OneCode^{SOLUTION}, a particular implementation of 4-state barcode, as an alternative to PLANET Code and POSTNET barcodes on letters and flats. Confirm Service using OneCode^{SOLUTION} is called OneCode^{CONFIRM}. Initially, OneCode^{CONFIRM} will be offered for use on letter mail only.

[1] The length of 13 does not include the check digit. Reader of this document is assumed to be familiar with the Confirm® Service. Additional information can be found in Publication 197, Confirm Service User Guide, which can be obtained at www.mailtracking.usps.com.

1.4 Approximate Timeline

The development of the decoding software to read OneCode^{SOLUTION} barcode has been completed. The capabilities to read OneCode^{SOLUTION} barcode will be enabled on letter and flat sorters along with the deployment of ongoing Engineering programs. For letter mail equipment, OneCode^{SOLUTION} barcode reading is being incorporated into the wide field-of-view camera program. For flat sorting equipment, it is being incorporated into the flats ID Code sort system, which is expected to be completed in late 2006.

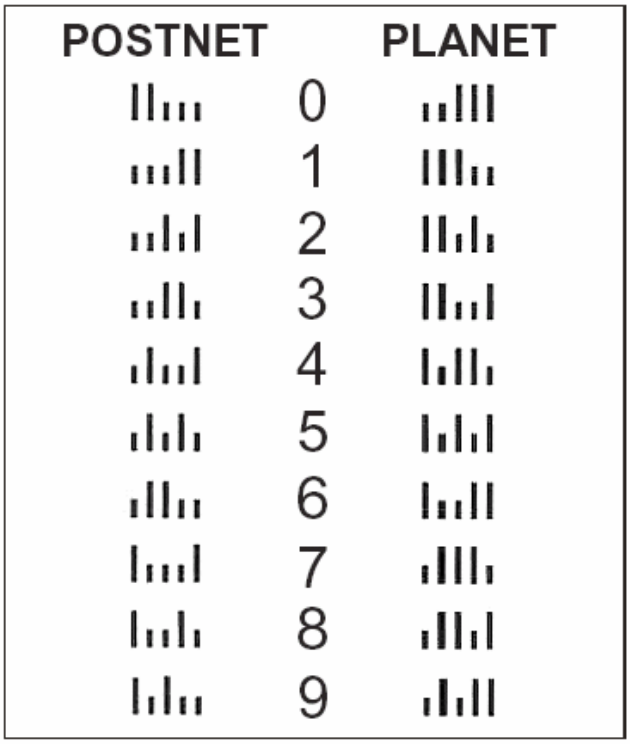
As listed below, a series of tests are in progress to ensure the success of reading OneCode^{SOLUTION} barcode on letters and flats. Some of the tests and their anticipated dates are listed here:

Early '04	Computer simulated testing of decoding software (completed)
Mid '04	Testing encoding software (Windows' version) with mailers (completed)
Mid '04	Lab testing on a letter mail sorter using test decks (completed)
Mid '04	Testing readability on USPS internally generated letter mail (Ongoing)
Early '05	Live letter mail testing with Confirm users (Ongoing)
Summer '06	Formal launching of OneCode^{CONFIRM} for letter mail

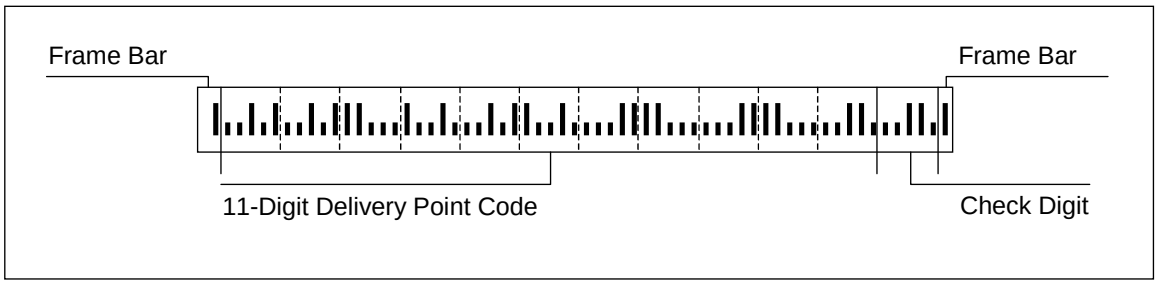
2 OneCode^{SOLUTION} Barcode Specifications

2.1 Review of POSTNET® and PLANET Code®

POSTNET and PLANET Code are height-modulated linear barcodes that use the height of regularly spaced bars to encode numeric information. In POSTNET barcode, each digit is encoded by 5 bars, two of which are tall bars, and the remaining three are short bars. In PLANET Code barcode, each digit is also encoded by 5 bars, three of which are tall bars, and the remaining two are short bars. The representation of the numerals in POSTNET and PLANET Codes are shown in the following table.

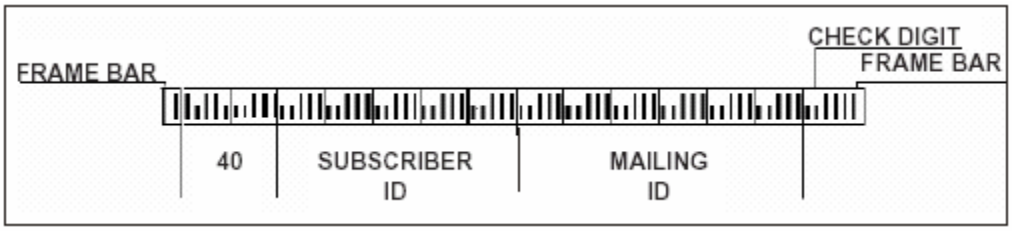


The POSTNET barcode consists of 5, 9, or 11 digits for the delivery point code, followed by a check digit. The entire string is preceded and followed by a frame bar, which is a tall bar. See the illustration below.



The PLANET Code barcode for Confirm® consists of a 2-digit service code, a 5-digit subscriber ID identifying the mailer, and a 4- or 6-digit mailing ID for identifying the mail piece, followed by a check digit.

Like the POSTNET Code, there is a tall bar at the beginning and the end of the barcode. See the illustration below, which shows a 6-digit mailing ID.

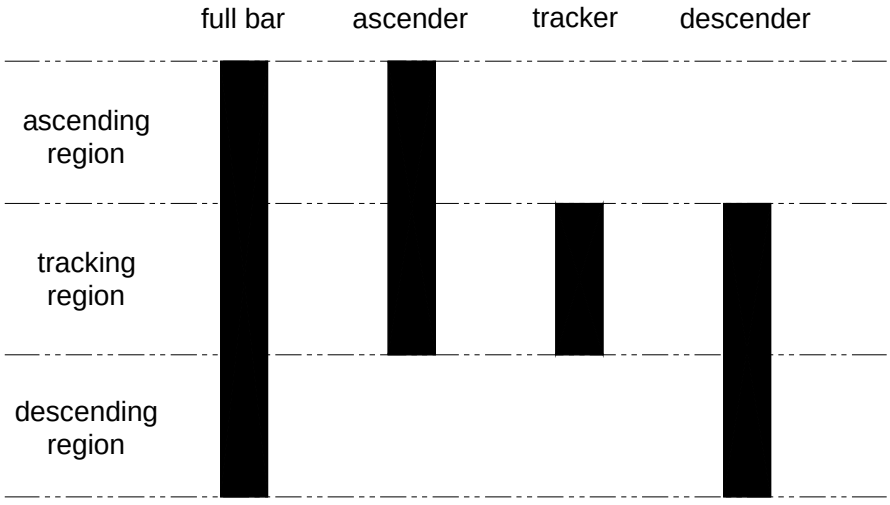


2.2 OneCode^{SOLUTION} Barcode

The OneCode^{SOLUTION} barcode is a height-modulated barcode designed for use in high speed, automated, mail sortation machines that allow both the PLANET Code barcode and POSTNET barcode information to be combined into a single barcode with expanded tracking capability.

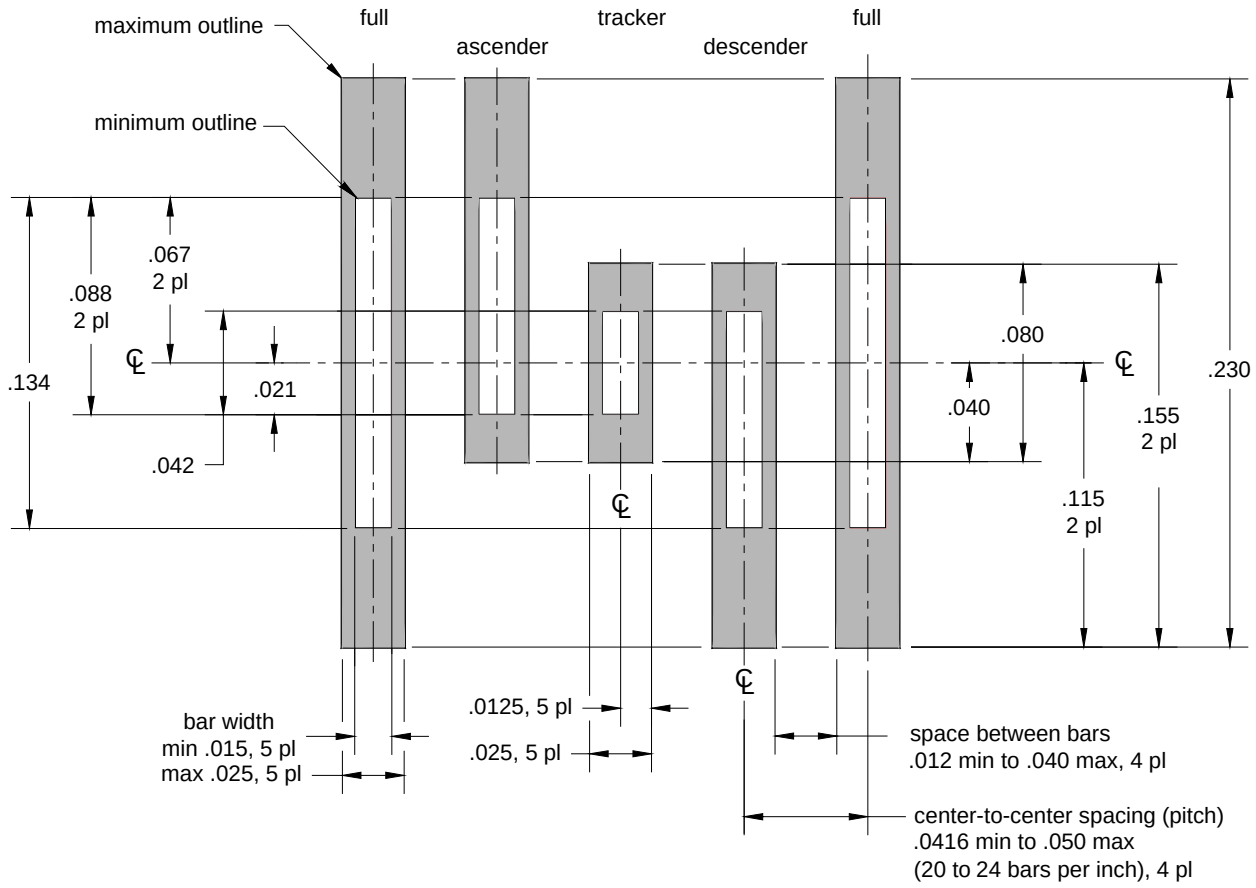
2.2.1 Barcode Symbology

The OneCode^{SOLUTION} barcode consists of 65 vertical bars each representing one of four possible states: full bar, ascender, tracker, and descender.



2.2.2 Print Specifications

Below are the preliminary specifications of the minimum and maximum dimensions for the OneCode^{SOLUTION} barcode.

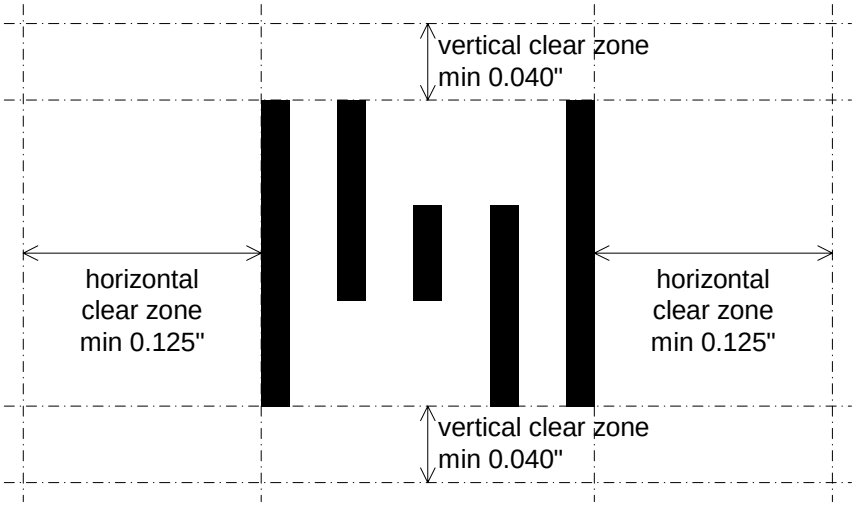


Vertical dimensions shall be based on the centerline of the barcode, forming an overall barcode height of 0.134 inch to 0.23 inch. Any vertical jitter shall be contained within the vertical dimensions from the centerline.

Horizontal dimensions shall be based on the centerline of the individual bars, forming an overall barcode pitch of 22±2 bars per inch. Individual bars shall be printed with a width of 0.020±0.005 inch. The pitch and widths shall result in a spacing between bars of 0.012 inch to 0.040 inch.

2.2.3 Clear zone

A clear zone is required around the barcode to ensure that the barcode readers can locate and read the barcode. A minimum clear zone of 0.040” is required above and below the barcode. A minimum clear zone of 0.125” is required on each end of the barcode. Clear zones are shown below.

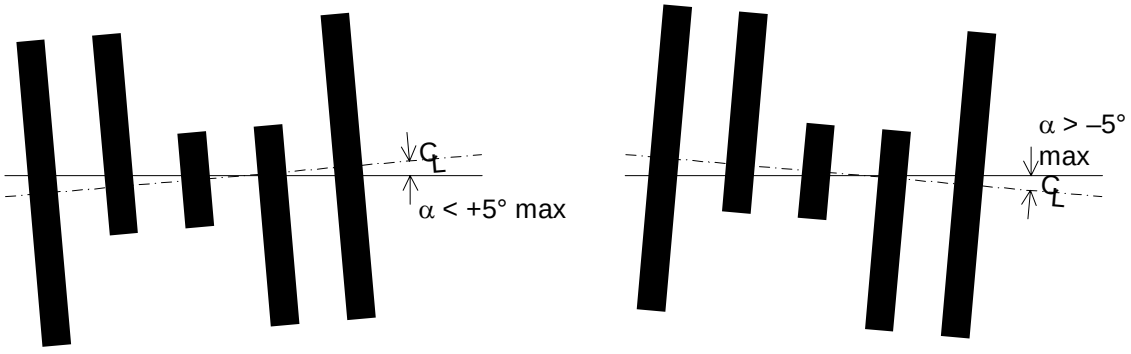


2.2.4 Barcode Tilt

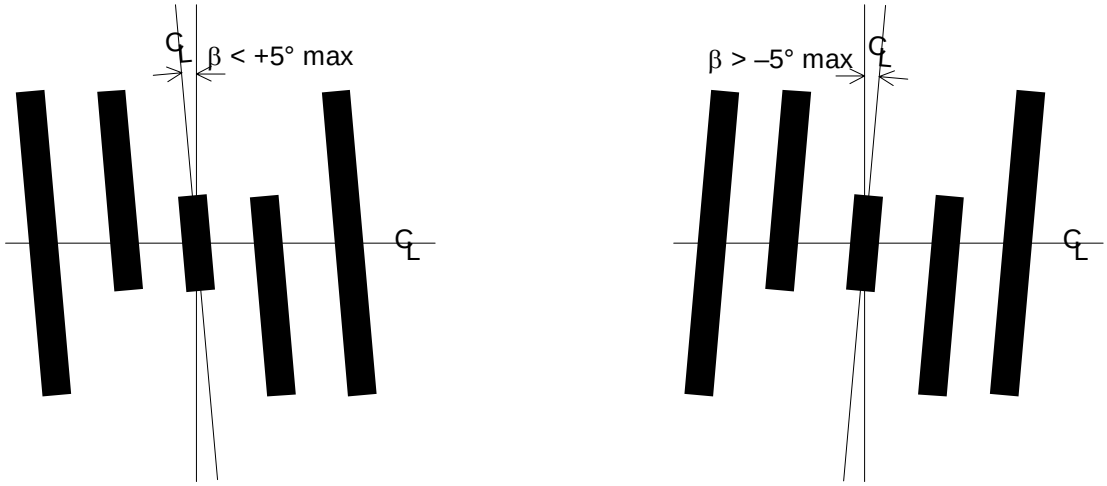
When printing OneCode^{SOLUTION} barcodes, two types of tilt can occur:

- barcode skew, in which the entire barcode is skewed with respect to the bottom edge of the mail piece
- bar rotation, in which the individual bars are rotated with respect to the centerline of the barcode

Both types of tilt may occur simultaneously.
Barcode skew must to limited to ±5°, as shown in the figure “Barcode Skew” below.
Bar rotation must be limited to ±5°, as shown in the figure “Bar Rotation” on page 9.
The total tilt must be limited to ±5°, $|\alpha| + |\beta| < 5°$.



Barcode Skew



Bar Rotation

2.2.5 Data Encoding

Encoding data into a POSTNET or PLANET Code is very straightforward: each digit in the data payload is represented by a predefined pattern of 5 bars. Encoding data into a OneCode^{SOLUTION} barcode is more complex. The data payload is a fixed-length array of 31 base-10 digits. An encoding algorithm translates these 31 digits into 65 bars.

For example, the payload

tracking = 01234567094987654321, routing = 01234

will be encoded into a series of 65 bars, each represented in the following string by a letter that designates the bar type. (D=Descender, A=Ascender, etc.)

DTTAFADDTTFTDTFTFDTDDADADAFADFATDDFTAAAFDTTADFAAATDFDTDFADDDTDFFT

The actual barcode will look like this:

This document does not describe the exact algorithm for encoding. It can be found in *Specification USPS-B-3200*, and the US Postal Service will provide encoding software to the mailing community for generation of OneCode^{SOLUTION} barcode.

Because of the complexity of encoding, the OneCode^{SOLUTION} barcode does not lend itself to easy manual decoding.

2.2.6 Barcode Placement

OneCode[SOLUTION] barcode may be applied above the address block as shown in the following example. The use of POSTNET barcode below the address block to encode the delivery point barcode is optional, since the OneCode[SOLUTION] barcode can also encode the delivery point barcode.

EXAMPLE 1: Placement of the OneCode[SOLUTION] above the address block, with the ***optional*** POSTNET barcode located below the address.

Jessica H. Jones
2990 Pittsburgh Drive
Anytown, DC 01234-5678

2.3 Data Payload

The following table shows the preliminary payload layout for the OneCode[SOLUTION] barcode. Side-by-side comparison with POSTNET and PLANET Code barcode is also provided.

OneCode[SOLUTION]		**POSTNET**	**PLANET Code Destination Confirm**		**PLANET Code Origin Confirm**	
Field Name	**Length**		**Field Name**	**Length**	**Field name**	**Length**
Barcode ID	2[2]					
Special Services	3		Service Type	2	Service Type	2
Customer Identifier	6		Subscriber ID	5	Customer ID	9 or 11
Sequence Number	9		Mailing ID	4 or 6		
Routing ZIP	0, 5, 9, 11	5, 9, 11				
Total Max Digits	**31**	**11**		**13**		**13**

For Origin Confirm used for incoming reply mail, OneCode[CONFIRM] subscribers will have a total of 15 digits to uniquely identify the reply mailpieces (9 digits from the Sequence Number field plus 6 digits from the Customer ID field). Origin Confirm Subscribers will still be required to register their complete delivery point code to serve as a subscriber identifier.

2.3.1 Barcode ID

The Barcode Identifier field in a OneCode[SOLUTION] barcode is a 2-digit field that is reserved for future use to encode the presort identification that is currently printed in human readable form on the optional

[2] The second digit of Barcode ID must be 0–4.

endorsement line (OEL) so as to provide additional functionalities. Initially, and until further notice to the contrary, this field should be left as "00" by OneCode^{CONFIRM} users. At a later date, the USPS may require the proper coding of this field.

2.3.2 Special Services

All OneCode^{SOLUTION} barcodes contain a 3-digit Special Services field that identifies the type of service or product. In the long run, the field is intended to allow a single OneCode^{SOLUTION} barcode to support multiple services in addition to or instead of Confirm.

OneCode^{CONFIRM} subscribers must fill the "Special Services" field with the proper USPS-assigned 3-digit Special Service Code. In Confirm® Service using PLANET Code barcode, the Service Type ID not only designates whether Destination Confirm or Origin Confirm is selected; it also indicates mail class and mail type. The Special Services field in a OneCode^{SOLUTION} barcode will only designate service type and mail class, but not mail type. The following table shows the mapping of the PLANET Code barcode Service Type ID to OneCode^{SOLUTION} barcode Special Services code.

Confirm® Service Requested and Mail Class and Type	**Service Type ID in PLANET Code barcode**	**Special Services Code in OneCode^{SOLUTION} Barcode**
Destination (Residual First Class Mail)	22	040
Destination (First Class Mail Letters)	40	040
Destination (First Class Mail Flats)	41	040
Destination (Standard Mail Letters)	42	042
Destination (Standard Mail Flats)	43	042
Destination (Periodicals Letters)	44	044
Destination (Periodicals Flats)	45	044
Destination (First-Class Mail Cards)	46	040
Destination (Standard Mail Cards)	47	040
Origin (Miscellaneous)	21	050
Origin (Courtesy Reply Letters)	50	050
Origin (Courtesy Reply Flats)	51	050
Origin (Business Reply Letters)	52	050
Origin (Business Reply Flats)	53	050
Origin (Business Reply Cards)	54	050
Origin (QBRM Letters)	56	050
Origin (QBRM Cards)	57	050
Origin (Courtesy Reply Cards)	58	050

2.3.3 Customer Identifier and Sequence Number

In a OneCode^{SOLUTION} barcode, the Customer Identifier field is a 6-digit number identifying the mailer or subscriber. At the initial launching of OneCode^{SOLUTION}, current Destination Confirm subscribers will append a leading zero to their existing 5-digit Subscriber ID to form the new Customer Identifier field. New Destination Confirm subscribers will continue to be assigned 5-digit Subscriber ID (which will be

used in conjunction with a leading zero to form the new Customer ID field) through the Business Entity Identifier (BEI) program.

The Sequence Number field in a OneCode^{SOLUTION} barcode is a 9-digit field. For Destination Confirm, this field will hold the existing Mailing ID field, which is a 4- or 6-digit field. Subscribers can expand the Mailing ID field to 9 digits if so desired. Otherwise, leading zeros should be used to fill the field completely.

For the existing Origin Confirm, the PLANET Code barcode does not have a Subscriber ID field. When using OneCode^{SOLUTION} barcode for Origin Confirm, subscribers may combine the Customer Identifier field and the Sequence Number field into a 15-digit field to hold the existing 9- or 11-digit Customer ID field plus additional digits. Subscribers can expand this field to 15 digits if so desired. Otherwise, leading zeros should be used to fill the field completely.

2.3.4 Routing ZIP

The Routing ZIP Code field will accommodate 5, 9 or 11 digit ZIP Code information. This field must contain only the Delivery Point ZIP Code for the addressee. DO NOT fill this field with preceding or trailing zeros.

3 Scan Record Format

Confirm® generates data that reflect the induction and automated processing of mail that has a OneCode^{SOLUTION} barcode. When mail that has a OneCode^{SOLUTION} barcode is scanned by the Postal Service's high-speed mail processing equipment, comma-delimited raw scan data records are created. The scan records that are produced during sort operations allow customers to interpret the data and estimate when mail pieces are near delivery. OneCode^{SOLUTION} raw scan data files will be separate from the existing PLANET Code raw scan data files received today.

3.1 Mail piece Scan Record Format

The mail piece scan record represents where, when, and at which operation level an individual mail piece from a shipment is processed. This type of scan record is generated when a mail piece is processed on mail processing equipment barcode sorters. A mail piece is likely to generate multiple mail piece scan records as it is processed on automated equipment prior to delivery. However, the Postal Service cannot guarantee that every Confirm mail piece with a OneCode^{SOLUTION} barcode will receive a scan. The table below provides the format of the raw mail piece scan records.

Position	Name	Description
1-5	Facility ID	The 5-digit number representing the facility where mail was processed
7-9	Operation Code	The code that indicates the level of sort operation mail was processed
11-29	Scan Date & Time	The date (mm/dd/yyyy) and time (hh:mm:ss) the mail was processed
31-41	Routing ZIP Code	The Destination ZIP Code used to process the mail piece (5, 9, or 11 digits)
43-62	Tracking Code of OneCode^{SOLUTION}	The 20-digit string consisting of Barcode ID, Special Services, Customer Identifier, and Sequence Number

Note: A list of facility IDs can be obtained by contacting Confirm® Customer Support at 800-238-3150. The list of 3-digit operation codes is available in electronic format on the Confirm Web site at *mailtracking.usps.com.*

3.2 Mail piece Scan Records

Below is an example of the OneCode^{SOLUTION} raw data file. All columns are separated by commas:

```
22081,896,12/29/2004 11:20:50,20155174817,00040022010990019102
22081,896,12/29/2004 11:20:50,20155174817,00040022010990019101
22081,896,12/29/2004 11:20:50,20155174817,00040022010990019104
22081,896,12/29/2004 11:20:50,20155174817,00040022010990019103
22081,896,12/29/2004 11:20:50,20155174817,00041022010990019106
```

4 Additional Information

4.1 CONTACT

For further information about OneCode^{SOLUTION}, please contact:

Margaret L Choiniere

Intelligent Mail Planning & Standards

US Postal Service

8403 Lee HWY

Merrifield VA 22082

Office: 703-280-7401

FAX: 703-280-8403

4.2 DISCLAIMER

Information conveyed in this document is preliminary. The information in this document is intended to give mailers and service providers preliminary information on the use of OneCode^{SOLUTION} barcode for Confirm® Service. The U.S. Postal Service reserves the right to change the information conveyed in this document without prior notice.